Our ref: KON-1836 Client's ref: P6263-001-0000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: N. SASA	:	Art Unit: 1714
Appln. No. : 10/718,408	:	
Filed : November 20, 2003	:	Examiner: C. E. Shosho
Title : ACTINIC RAY CURABLE INK AND PRINTED MATTER UTILIZING THE SAME	:	

DECLARATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

S i r:

I, Nobumasa Sasa, hereby declare and say as follows:

1. I presented the Declaration dated April 11, 2006 (April 2006 Declaration) and another Declaration dated November 22, 2005 (November 2005 Declaration) in this Application.

2. I am aware, in an Advisory Action, that the Examiner stated that the previous test results were not commensurate in scope with the present claims of this Application because only one amount of epoxidized soybean oil was tested; and because the oxetane compound that was tested did not fall within the scope of Claims 12 and 13. In order to address the Examiner's comments, additional tests have been run which both use different amounts of oxetane and epoxidized soybean oil; and which employ different oxetane compounds that fall within the scope of Claims 12 and 13. Two additional tests were run using the ink formulation of Roth and employing an oxetane compound. These two additional tests were done for purposes of comparison. All the tests reported herein were performed either by me or under my direct supervision and control.

3. Eleven (11) different ink compositions were prepared by combining the ingredients in the amounts shown in Table A, attached hereto. The photoinitiator is added last and in darkness to avoid any possible curing of the ink. It will be noted that Samples 23(1) through 23(5) employ oxetane compounds as recited in Claims 12 and 13, while maintaining all other variables constant. Ink numbers 23(6) through

23(9) varied the amount of the oxetane and epoxidized soybean oil in order to illustrate different amounts for these two components. All other variables with respect to ink numbers 23(6) through 23(9) were kept constant. The exact chemical composition and amounts of chemicals employed in ink numbers 23(1) through ink numbers 23(9) are shown in Table A, attached.

4. Ink numbers 24 and 25 are variations of an ink composition in accordance with Roth. In Example 1 of Roth at Column 13, he teaches using a vinyl ether monomer, an epoxy monomer, a photoinitiator and a dye. Example 24 in Table A replaces the epoxy monomer of Example 1 of Roth with an oxetane compound. Example 25 in Table A adds an oxetane compound to the composition taught in Example 1 of Roth. Both the amounts and the specific compounds employed for ink numbers 24 and 25 are recited in Table A.

5. Each one of the ink compositions listed in Table A, attached, was tested for viscosity, ink storage stability and safety following the test procedures outlined on pages 23-24 of the Application. The results of these tests are reported in Table B, attached hereto.

6. Ink numbers 23(1) through 23(9) illustrate that the present Invention works for all of the oxetane compounds recited in Claims 12 and 13 and for different amounts of oxetane compounds. Specifically, each one of these inks had a storage stability classification of A, meaning that the viscosity during storage at 55°C for one week varied, if at all, less than 2.0 mPa·s. The data also showed that the safety of these inks showed no change or only slight change when adhered to the skin.

7. The data in Table B also demonstrates that adding an oxetane compound to an ink formulation made in accordance with Example 1 of Roth, namely, ink number 25, produces an inferior ink compared to the present Invention. Ink 25 showed poor storage stability, namely, a viscosity difference of more than 5 mPa·s after storage at 55°C for one week and showed blistering of the skin. I find the results of ink number 25 compared to ink 23(1) through ink 23(9) to be surprising and unexpected in that inks 23(1) through 23(9) is superior in both storage stability and safety compared to ink number 25.

8. Ink number 24 also showed poorer results than ink numbers 23(1) through 23(9). Specifically, ink number 24 showed viscosity variation before and after storage of more than 5 mPa·s and showed redness and blistering of the skin when adhered to the skin. I consider it surprising and unexpected that ink numbers 23(1) through 23(9) is so superior to ink number 24 in both storage stability and safety.

9. Ink numbers 24 and 25 in Tables A and B attached, can be compared to ink number 2 in Tables A and B attached to the November 2005 Declaration. Ink number 2 of the November 2005 Declaration is a formulation of Example 1 of Roth using epoxy compounds, a vinyl ether monomer, a photo initiator and a dye. As can be seen in Table B of the November 2005 Declaration, ink 2 had a storage stability rating of C and a safety rating of C. The result in this rating is virtually identical to the ink storage stability and the safety range of ink numbers 24 and 25. Adding oxetane to the composition of Example 1 of Roth, ink number 25, does not result in an improvement of ink number 2. In fact, ink number 25 had the same viscosity as ink number 2. For ink number 24, it can be seen that, when the epoxy monomer was replaced with oxetane, the viscosity decreased,

however, the ink storage stability and the safety remained essentially the same. I find it surprising and unexpected that ink numbers 23(1) through 23(9) are so superior compared to ink numbers 2, 24 and 25.

10. I am of the opinion that it is fair to compare the inks in the April 2006 Declaration, the inks in the November 2005 Declaration and the inks in this Declaration since all of the inks were tested in the same manner for ink viscosity, ink storage stability and safety.

11. It is declared by undersigned that all statements made herein of undersigned's own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the U.S. Code; and that such willful false statements may jeopardize the validity of this Application or any patent issuing thereon.

Nobumasa Sasa

Nobumasa Sasa

Dated: This 19th day of June, 2006.

Attached: Table A and Table B

TABLE A

Ink No.	Epoxidized aliphatic acid ester or glyceride	Oxetane compound	Epoxy compound	Polymerizable compound	Initiator	Colorant
23 (1)	Epoxidized soybean oil Daimic S-300K (58 parts by weight)	3-ethyl-3-hydroxymethl oxetane (8 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)
23 (2)	Epoxidized soybean oil Daimic S-300K (58 parts by weight)	3-ethyl-3-(phenoxymethyl) oxetane (8 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)
23 (3)	Epoxidized soybean oil Daimic S-300K (58 parts by weight)	di(1-ethyl-3-oxetanyl) methyl ether (8 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)
23 (4)	Epoxidized soybean oil Daimic S-300K (58 parts by weight)	1,4-bis[(3-ethyl-3-oxetanyl) methoxymethyl] benzene (8 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)
23 (5)	Epoxidized soybean oil Daimic S-300K (58 parts by weight)	3-ethyl-3-(2-ethylhexyloxymethyl) oxetane (8 parts by weight)			SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)

TABLE A CONTINUED

23 (6)	Epoxidized soybean oil Daimic S-300K (8 parts by weight)	3-ethyl-3-hydroxymethyl oxetane (87 parts by weight)			SarCat CD 1012 (3 parts by weight)	Bromocresol Purple (2 parts by weight)
23 (7)	Epoxidized soybean oil Daimic S-300K (45 parts by weight)	3-ethyl-3-hydroxymethyl oxetane (50 parts by weight)			SarCat CD 1012 (3 parts by weight)	Bromocresol Purple (2 parts by weight)
23 (8)	Epoxidized soybean oil Daimic S-300K (80 parts by weight)	3-ethyl-3-hydroxymethyl oxetane (15 parts by weight)			SarCat CD 1012 (3 parts by weight)	Bromocresol Purple (2 parts by weight)
23 (9)	Epoxidized soybean oil Daimic S-300K (84 parts by weight)	3-ethyl-3-hydroxymethyl oxetane (11 parts by weight)			SarCat CD 1012 (3 parts by weight)	Bromocresol Purple (2 parts by weight)
24		3-ethyl-3-hydroxymethyl oxetane (40 parts by weight)		Triethylene Glycol Divinyl Ether (58 parts by weight)	SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)
25		3-ethyl-3-hydroxymethyl oxetane (13 parts by weight)	Cyracure UVR 6105 (35 parts by weight)	Triethylene Glycol Divinyl Ether (50 parts by weight)	SarCat CD 1012 (1.5 parts by weight)	Bromocresol Purple (0.5 parts by weight)

TABLE B

Ink No.	Viscosity mPa•s (23°C)	Ink Storage Stability	Safety	Remarks
23 (1)	12	A	A	Invention
23 (2)	11	A	A	Invention
23 (3)	11	A	A	Invention
23 (4)	20	A	A-B	Invention
23 (5)	9	A	A-B	Invention
23 (6)	19	A	A-B	Invention
23 (7)	16	A	A	Invention
23 (8)	14	A	A	Invention
23 (9)	13	B	A	Invention
24	19	C	B-C	Comparison
25	35	C	C	Comparison